

Summary of ATW Working Group

Mark Chadwick, LANL

The following is a transcription of the summary transparencies presented by Mark Chadwick for the ATW Working group. (Transcription by S. Karataglidis, LANL.)

Several people reported to the ATW Working Group on various problems that may be addressed by RIA. Those were:

Phillip Finck, ANL, who presented a plenary talk on an overview of ATW.

Holly Trellue, LANL, who presented an overview of ATW simulations.

Richard Pardo, ANL, who gave a talk on accelerator mass spectrometry.

Bob Haight, LANL, who gave a talk on (n, γ) reactions for ATW.

Steven Karataglidis, LANL, who gave a talk on optical model theory and the needs for ATW.

Dennis Slaughter, LLNL, who gave a review of previous studies on ATW data needs and how RIA may relate.

Peter Moller, LANL, who presented a model for fission barriers.

Stepan Mashnik, LANL, who presented a talk on how RIA would improve models of ATW.

1 Phillip Finck, ANL

- Presented an overview of ATW.
- The ATW time-line is projected to be roughly 13 years: 10 for building a test-bed facility and 3 with initially using non-actinide (conventional) fuels.
- USA versus Europe: Europe has lots of nuclear data measurements of relevance to ATW, done by the basic physics community.
- Challenges for ATW:
 - long-lived nuclides;

- needs neutron reactions – inverse kinematics (d,p) at low energies?
- many cross sections have already been measured. More are needed.
- current U.S. design has lots of Pu in the fuel.

2 Richard Pardo, ANL

- AMS will be part of RIA (already is at Argonne).
- Integral experiments: “burn-up samples”. Small minor actinide sample, irradiated at a future ATW test facility, could have cross sections analyzed at an AMS. Again, one needs to measure the integral σ_f/σ_c .

3 Bob Haight, LANL

- (n, γ) for ATW is hard, since ATW needs information on long half-lives, and RIA will produce species of short half-lives. Neutrons are needed also. BUT
- RIA could make high-purity isotopic samples (ORNL sometimes fails here) and use these samples elsewhere (e.g. LANSCE).
- proton reaction information helps improve physics models.

4 Steven Karataglidis, LANL

- New microscopic theory of the nucleon-nucleus optical potential, currently good for > 40 MeV.
- RIA would provide proton elastic/inelastic scattering data in the inverse kinematics to help test and improve the optical model.
- It would thus provide a stringent test of the neutron-nucleus optical potentials used in the ATW data files.

5 Dennis Slaughter, LLNL

- Reviewed previous ATW LLNL/LANL proposal.
- Cost/benefit analysis of improved data. Needs: $\sigma_f, \bar{\nu}(n, \gamma)$, eg. $^{209}\text{Bi}(n, \gamma)^{210}\text{Po}$.
- proton (as well as neutron) reactions help improve physics theory.

6 Peter Moller, LANL

- Presented a model for calculating fission barriers.
- New model predicts fission fragment distributions properties.
- Higher-energy fission fragment data would help test/develop the model (as with GSI).

7 Stepan Mashnik, LANL

- How GSI fragmentation data has stimulated model design (particularly Pb and U).
- Inverse kinematics: proton on minor actinides. Fragmentation from RIA will be useful in improving models.